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| 09/624,691      | 07/24/2000  | Nada El-Zein         | JG00009             | 6599             |

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EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT PAPER NUMBER

2815

DATE MAILED: 11/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/624,691

Applicant(s)  
El-Zein et al.

Examiner  
B. William Baumeister

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2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Sep 13, 2002
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 67-110 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 67-110 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 8 6) ☐ Other:

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### **DETAILED ACTION**

The present application has been re-assigned to a new examiner as part of the Motorola bulk-filing project.

#### ***Allowable Subject Matter***

1. The indicated allowability of various claims is withdrawn in view of the newly discovered reference(s) to Guenzer, Kaushik and Serizawa. Rejections based on the newly cited reference(s) follow.

#### ***Claim Objections***

Claims 86, 87 and 101 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. These cited claims are substantively identical to claims 82 and/or 83 from which the cited claims ultimately depend and do not add any further limitations.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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2. Claims 67-99 and 101-110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guenzer '653 in view of Kaushik et al., "Device Characteristics of Crystalline Epitaxial Oxides on Silicon;" Device Research Conference, 2000, Conference Digest 58th DRC, pp. 17-20, June 19-21, 2000 and JP 52-89070.

a. Guenzer '653 teaches a semiconductor layer 14 which may either be composed of Si or a compound semiconductor (see e.g., col. 3, lines 55-) and that is formed over a monocrystalline Si substrate 22 by means of a perovskite layer such as BTO 12 or others (col. 3, lines 45-55) and an amorphous SiO<sub>x</sub> layer 24. Guenzer does not read on those limitations of the claims that set further forth that the perovskite layer 12 and the compound semiconductor layer 14 are monocrystalline. Rather, Guenzer teaches that the epitaxial perovskite is "crystallographically oriented" which he defines to mean strongly oriented in the c-axis direction, but that the a- and b- axis directions possess a mosaic crystalline structure (e.g., col. 2, lines 5-44). Guenzer further states that the crystallographically oriented perovskite causes the resultant superposed epitaxial layer to also be a crystallographically oriented layer that does not have the very high quality of singly crystalline semiconductor material, but which is better than polycrystalline layers, so that transistors should be able to be formed therein (col. 4, lines 12-20). To summarize, Guenzer teaches the integration of compound semiconductor layers with devices formed therein on monocrystalline Si substrates; it teaches that crystalline imperfections in the perovskite buffer will produce crystalline imperfections in this overlying epitaxial device layer; and it provides motivation as to why one would have desired to form a monocrystalline buffer and

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therefor a monocrystalline epitaxial device layer instead of ones that are crystallographically oriented: to produce higher quality transistors or devices.

b. Kaushik teaches the growth of monocrystalline epitaxial perovskite oxides such as STO over monocrystalline substrates which produces an amorphous SiO<sub>2</sub> interface layer therebetween. The article does not teach the further inclusion of a compound semiconductor layer on top of the monocrystalline perovskite oxide.

c. JP '070 teaches the growth of monocrystalline (100) Si, III-Vs (such as GaAs, GaP and InP) or II-VIs (such as ZnSe and ZnTe) on monocrystalline (001) or (100) perovskite oxides such as STO, BTO, SZO and BZO.

d. It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the teachings of Kaushik and JP '070 to form a monocrystalline, epitaxial compound-semiconductor device layer on a monocrystalline Si substrate by means of a monocrystalline perovskite oxide such as STO and a layer of amorphous Si oxide for the purpose of producing an epitaxial device layer that will enable the formation of better quality components therein, as Guenzer '653 teaches is desirable.

e. Regarding the claim limitations directed towards the specific devices/circuits formed in/on the compound semiconductor and/or substrate layers (i.e.: tunnel diode and associated circuitry), Official Notice is taken that these specific devices and/or circuits as well as the associated methods of forming them were, themselves, conventional and known to those of ordinary skill in the art at the time of the invention. This assertion is evidenced by factors such as

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(1) various prior art references supplied in the IDS submissions in the present and/or various ones of the approximately 300 related applications; (2) the absence of any assertions in the present specification that the particular device(s) and/or circuit(s) formed on the recited semiconductor layer(s) was/(were) unknown, have any novel features beyond being integrated on the (monocrystalline Si) substrate, or produced any unexpected results; (3) Applicant's admissions/statements in the specification that III-V based tunnel diodes were known (BACKGROUND) and (4) the prior art of record that is directed towards tunnel diodes and applied in the previous rejections.

f. Further, it was well known to those of ordinary skill in the art at the time of the invention to form a wide array of active and passive devices on compound semiconductor layers instead of Si for various reasons such as (1) for producing devices and circuits that have higher frequencies and/or faster operation than is afforded by Si; and (2) because unlike Si, many conventional compound semiconductors are direct bandgap materials, enabling the formation of optoelectronic devices such as light emitters, detectors and modulators. Such conventional compound semiconductors include many of the III-Vs (e.g, III-As, III-P, III-N and combinations thereof) and the II-VIs.

g. Moreover, it has been a decades-long-sought industry goal to be able to reliably form compound semiconductor layers on Si substrates (1) for the purpose of integrating compound semiconductor devices with Si devices on a single chip because this would reduce the number, size and/or total space of required components and reduce the length or eliminate the

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number of requisite, associated electrical interconnections; and (2) because the elimination of the need for a compound semiconductor wafer would greatly reduce the manufacturing costs since Si substrates are so much cheaper to produce than compound semiconductor wafers. While this desire to form compound semiconductor layers on Si substrates was conventional, the ability to actually do so has generally proven difficult because of the dissimilarities that exist between various properties of Si and the compound semiconductors, such as their dissimilar lattice constants. Conventional attempts to form compound semiconductors on Si have previously included schemes such as the use of wafer-bonding techniques and the use of intermediate buffer layers.

h. Since the prior art teaches that it was obvious at the time of the invention to have formed the compound semiconductor layer on the substrate by means of the specific buffer layer(s) as presently claimed, it would have further been obvious to one of ordinary skill in the art at the time of the invention to have formed the specifically recited components on the compound semiconductor layer and the Si layer, with the recited interconnections since the particular devices/circuits were conventional, there was a strong and widely known motivation in the industry to integrate compound and Si semiconductor devices/circuits and because the integration of the present particular devices does not produce any unexpected results.

i. Various claims set forth that the oxide layer is formed as a monocrystalline layer and converted to an oxide layer. Under the well-established product-by process doctrine, since the claims are directed towards a structure, it is immaterial how the final amorphous structure was

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made since the process does not limit the structure (i.e., it is immaterial whether the amorphous layer was at one time monocrystalline).

i. Further, while the examiner assumes that Applicant intended to be referring to the perovskite layer (e.g., BSTO) layer, various claims are broad enough to read on either (1) an amorphous SiO<sub>x</sub> layer or (2) a buffer comprising of a perovskite layer and an amorphous SiO<sub>x</sub> layer, respectively. For example, claim 84--which depends from claim 73--sets forth, in part:

“an oxide layer formed overlying the substrate...wherein the oxide layer comprises BSTO... [claim 73]  
...wherein the oxide layer comprises and amorphous oxide layer.” [claim 84]

This language is broad enough to read on a compound oxide layer comprising a BSTO layer and an amorphous SiO<sub>x</sub> layer.

ii. Similarly, claim 100--which ultimately depends from claim 83--sets forth an SiO<sub>x</sub> layer underlying the oxide layer. Claim 83, in turn, broadly sets forth an amorphous oxide. As such, the claim reads on two amorphous SiO<sub>x</sub> layers, but since amorphous SiO<sub>x</sub> has no long-range grain boundaries, two SiO<sub>x</sub> layers is structurally equivalent to one SiO<sub>x</sub> layer.

j. Regarding claims 93 and the associated dependent claims, Applicant has asserted that these claims correspond to claim 40, which the previous examiner has indicated as being allowable. In that no reasons for the indication of allowable subject matter appear in the record, it is unclear to the present examiner why the further recitation of a GaAs buffer would be cause for allowance. Rather, the formation of tunnel diodes on GaAs is known, and the references above



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discuss the formation of GaAs on BSTO oxides. Moreover, the lowest portion of the GaAs layer that is formed on a perovskite (or any other material forming a heterojunction) performs the function of buffering the rest of the superposed the GaAs layer. As such, it is structurally indistinguishable whether the lowest portion of a GaAs layer that is formed on the perovskite is referred to as part of the GaAs layer or as a separate GaAs buffer. Accordingly, the indication of allowable subject matter is withdrawn.

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### *Double Patenting*

3. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. **The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.**

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b)

5. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application.

6. Double-patenting conflicts exist between claims of the following related issued patents and co-pending applications which includes the present application.

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Serial Numbers of Related Issued Patents and Co-pending Applications:

|          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|
| 09273929 | 09755691 | 09882063 | 09906138 | 09911445 | 09921905 | 10017596 |
| 09274268 | 09758723 | 09882064 | 09906730 | 09911446 | 09921910 | 10020898 |
| 09425945 | 09766046 | 09882067 | 09906769 | 09911447 | 09924481 | 10020900 |
| 09465623 | 09780119 | 09884082 | 09906782 | 09911448 | 09927393 | 10026446 |
| 09584601 | 09795784 | 09884149 | 09906783 | 09911455 | 09927396 | 10026812 |
| 09607207 | 09801881 | 09884150 | 09906784 | 09911456 | 09928356 | 10053588 |
| 09607236 | 09813779 | 09884981 | 09907703 | 09911457 | 09929018 | 10059409 |
| 09607237 | 09822499 | 09884982 | 09907704 | 09911458 | 09929019 | 10059411 |
| 09607239 | 09822499 | 09884983 | 09907705 | 09911459 | 09929020 | 10062429 |
| 09607386 | 09824259 | 09885409 | 09907707 | 09911460 | 09929021 | 10076450 |
| 09607408 | 09824273 | 09897059 | 09908695 | 09911464 | 09929022 | 10091452 |
| 09607420 | 09824376 | 09897128 | 09908707 | 09911465 | 09929024 | 10124460 |
| 09607434 | 09824388 | 09897965 | 09908860 | 09911466 | 09929261 | 10125410 |
| 09607722 | 09824615 | 09897968 | 09908883 | 09911469 | 09929748 | 10125486 |
| 09607744 | 09832354 | 09899996 | 09908885 | 09911472 | 09930145 | 10125540 |
| 09608807 | 09838273 | 09899997 | 09908886 | 09911473 | 09930170 | 10128262 |
| 09609071 | 09840213 | 09900882 | 09908887 | 09911475 | 09930171 | 10134506 |
| 09609262 | 09842734 | 09900883 | 09908888 | 09911478 | 09930175 | 10136324 |
| 09617640 | 09842735 | 09900885 | 09908891 | 09911484 | 09930176 | 10137369 |
| 09621130 | 09849159 | 09900887 | 09908892 | 09911487 | 09930188 | 10137383 |
| 09621771 | 09849172 | 09900921 | 09908897 | 09911488 | 09930243 | 10140939 |
| 09621779 | 09852109 | 09901109 | 09908898 | 09911490 | 09930247 | 10141876 |
| 09624296 | 09853744 | 09901110 | 09908902 | 09911491 | 09930254 | 10145734 |
| 09624526 | 09859700 | 09901601 | 09909905 | 09911492 | 09930259 | 10150065 |
| 09624690 | 09861636 | 09901905 | 09909906 | 09911493 | 09930260 | 10150066 |
| 09624691 | 09861637 | 09903740 | 09909936 | 09911494 | 09930261 | 10151950 |
| 09624698 | 09861638 | 09903741 | 09909937 | 09911495 | 09930270 | 10152783 |
| 09624699 | 09861639 | 09903742 | 09909938 | 09911496 | 09930275 | 10161743 |
| 09624754 | 09865428 | 09903743 | 09909939 | 09911496 | 09930276 | 10166196 |
| 09624803 | 09865429 | 09903784 | 09909940 | 09911507 | 09930278 |          |
| 09624877 | 09865446 | 09904841 | 09909941 | 09911517 | 09930308 |          |
| 09625100 | 09865447 | 09904892 | 09910018 | 09911518 | 09930444 |          |
| 09629283 | 09865448 | 09904894 | 09910019 | 09911539 | 09934836 |          |
| 09642558 | 09865449 | 09904895 | 09910020 | 09911542 | 09960402 |          |
| 09656337 | 09866637 | 09905098 | 09910021 | 09911543 | 09975930 |          |
| 09662390 | 09870589 | 09905110 | 09910022 | 09911627 | 09978096 |          |
| 09669602 | 09870592 | 09905115 | 09910023 | 09911628 | 09983326 |          |
| 09678372 | 09870828 | 09905116 | 09910024 | 09911629 | 09983854 |          |
| 09689583 | 09870829 | 09905863 | 09910032 | 09911691 | 09983859 |          |
| 09692568 | 09870830 | 09905868 | 09910034 | 09911702 | 09983866 |          |
| 09712425 | 09870831 | 09905869 | 09910035 | 09918801 | 09983869 |          |
| 09712875 | 09870832 | 09905902 | 09910044 | 09918802 | 09984471 |          |
| 09721566 | 09870833 | 09905903 | 09910753 | 09919927 | 09985757 |          |
| 09733181 | 09870834 | 09905930 | 09910754 | 09919967 | 09986024 |          |
| 09733688 | 09870835 | 09905932 | 09910798 | 09921894 | 09986034 |          |
| 09740219 | 09870836 | 09905933 | 09910799 | 09921895 | 09986534 |          |
| 09740268 | 09870837 | 09905934 | 09911412 | 09921896 | 09986899 |          |
| 09753808 | 09871958 | 09905935 | 09911420 | 09921898 | 09993514 |          |
| 09755340 | 09874984 | 09905980 | 09911429 | 09921900 | 09993523 |          |
| 09755341 | 09882062 | 09905981 | 09911444 | 09921901 | 09994066 |          |

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7. While it is true that the Examiner has the burden to show how a rejection is specifically applied to each claim, the exemplary showing with respect to the claims individually discussed below establishes a *prima facie* showing of the unpatentability of the instant claims and is sufficient to give the applicant fair notice of how the rejection is applied to each and every other claim. Further, an analysis of all of the claims in the approximately 330 related applications would be an extreme burden on the Office requiring millions of claim comparisons. Accordingly, the Office is shifting the burden to the applicants to show, if they can, patentable distinctions between the instant claims and those of the other applications and patents. Specifically, in order to resolve the conflict between applications, applicant is required to:

- (1) file terminal disclaimers in each of the related, applications terminally disclaiming each of the other approximately 330 applications;
- (2) provide a statement attesting to the fact that all claims in the approximately 330 applications have been reviewed by applicant and that no conflicting claims exists between the applications. Applicant should provide all relevant factual information including the specific steps taken to insure that no conflicting claims exist between the applications; or;
- (3) resolve all conflicts between the claims in the above identified approximately 330 applications by identifying how all the claims in the instant application are distinct and separate inventions from all of the claims in all of the other approximately 330 identified applications. Note: the examples provided below are merely illustrative of the overall

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problem. Only addressing/correcting the specifically identified conflicts would **not** satisfy the requirement.

Further, due Applicant's better familiarity with the related applications, Applicant now has the burden of confirming that the preceding list is accurate and complete, or must take appropriate action(s) to assure that no such conflicts exist in any other applications that have been inadvertently omitted from the preceding list, but do in fact possess related subject matter.

Applicant is reminded that obviousness-type double patenting analysis entails a two-step process: (1) the claims of this application and the other approximately 330 applications must be construed; and (2) the claims of this application must be compared with the claims of the other applications to determine whether the differences in subject matter between the two claims render the claims patentably distinct. See Georgia-Pacific Corp. v. United States Gypsum Co., 195 F.3d 1322, 1326, 52 USPQ2d 1590, 1593 (Fed. Cir. 1999), and General Foods Corp. v. Studiengesellschaft Kohle, 972 F.2d 1272, 1279, 23 USPQ2d 1839, 1844 (Fed. Cir. 1992). As the Court of Customs and Patent Appeals (CCPA) explained: "[t]he fundamental reason for the rule [against "double patenting"] is *to prevent unjustified timewise extension of the right to exclude* granted by a patent no matter how the extension is brought about." In re Van Ornum, 686 F.2d 937, 943-44, 214 USPQ 761, 766 (CCPA 1982) (brackets and emphasis in the original) (quoting In re Schneller, 397 F.2d 350, 354, 158 USPQ 210, 214 (CCPA 1968)).

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**Failure to comply with the above requirement will result in abandonment of the application. However, the requirement will be held in abeyance until allowable subject matter has been indicated by the examiner.**

8. The following claim comparisons are examples of conflicts between three of the copending applications:

S.N. 09/908,892; claims 11

A process for fabricating a semiconductor structure comprising:

- providing a monocrystalline silicon substrate;
- depositing a monocrystalline perovskite oxide film overlying the monocrystalline silicon substrate, the film having a thickness less than a thickness of the material that would result in strain-induced defects;
- forming an amorphous oxide interface layer containing at least silicon and oxygen at an interface between the monocrystalline perovskite oxide film and the monocrystalline silicon substrate;
- epitaxially forming a layer of intermetallic compound overlaying the monocrystalline perovskite oxide film; and
- epitaxially forming a monocrystalline compound semiconductor layer overlying the layer of intermetallic compound.

S.N. 09/755,340; claims 17, 19 and 20:

[Claim 17] A process for fabricating a semiconductor structure comprising the steps of:

- providing a monocrystalline substrate;
- epitaxially growing [an] accommodating buffer layer overlying the monocrystalline substrate;
- forming an amorphous layer on the monocrystalline substrate during the growth of the accommodating buffer layer; and
- forming a monocrystalline conductive layer over the accommodating buffer layer;

[Claim 19] epitaxially growing an additional monocrystalline layer above the monocrystalline conductive layer;

[Claim 20] wherein the step of [claim 19] includes growing a semiconductor material layer.

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S.N. 09/986,024; claim 169:

A process for fabricating a semiconductor structure comprising:

- providing a monocrystalline silicon substrate;
- depositing a monocrystalline perovskite oxide film overlying the monocrystalline silicon substrate, the film having a thickness less than a thickness of the material that would result in strain-induced defects;
- forming an amorphous oxide interface layer containing at least silicon and oxygen at an interface between the monocrystalline perovskite oxide film and the monocrystalline silicon substrate; and
- epitaxially forming a monocrystalline compound semiconductor layer overlying the monocrystalline perovskite oxide film.

9. A comparison of the claims shows that all three applications set forth the method steps of providing a monocrystalline substrate; an accommodating buffer (or perovskite) layer; an amorphous oxide interface therebetween; and at least a monocrystalline semiconductor layer over the buffer/perovskite. The respective sets of claims are not identical because:

a. Claims 17, 19 and 20 of the '340 application are broader than claim 11 of the '892 application because the '340 claims do not further require that the monocrystalline substrate be Si; that the amorphous oxide interface layer also contain silicon; that the accommodating buffer specifically be a monocrystalline perovskite; that the conductive layer specifically be an intermetallic compound; nor that the monocrystalline semiconductor layer be a compound monocrystalline semiconductor layer.

b. Claim 169 of the '024 application is broader than claim 11 of the '892 application because the '024 claim does not require the additional presence of the epitaxially grown intermetallic compound layer.

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10. Accordingly, claims 17, 19 and 20 of the '340 application are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 11 of the copending '892 application. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 11 of the '892 application anticipates claims 17, 19 and 20 of the '340 application as explained above. See e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985) for the proposition that an obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but an examined application claim is not patentably distinct from the reference claim(s) because the examined claim is either anticipated by, or would have been obvious over, the reference claim(s). This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

11. Similarly, claim 169 of the '024 application is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 11 of the copending '892 application. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 11 of the '892 application anticipates claim 169 of the '024 application as explained above. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.



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12. While not specifically addressed herein, similar double-patenting conflicts also exist between the product claims of various applications as well. Moreover, while the Office has a long established policy of generally requiring restrictions between semiconductor product claims (class 257) and method claims (class 438) in a given application, this policy does not negate Applicant's responsibility for ensuring that no conflicts exist between those applications presenting product claims and those applications presenting method claims. This is because it is also well established agency policy that restricted product and method claims may be subject to rejoinder during the course of prosecution. See MPEP 821.04.

***Allowable Subject Matter***

13. The claims may be allowable, subject to further consideration and search, if they are narrowed to properly clarify that the amorphous oxide is a perovskite such as BSTO.

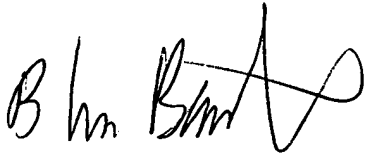
***Response to Arguments***

14. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

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**INFORMATION ON HOW TO CONTACT THE USPTO**

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at (703) 306-9165. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read 'B. William Baumeister', with a stylized, flowing script.

B. William Baumeister

Patent Examiner, Art Unit 2815

November 23, 2002